

Attachment 1 - Design and Construction

DIVISION of WASTE MANAGEMENT and RADIATION CONTROL APPLICATION for a PERMIT to OPERATE a CLASS VI LANDFILL

September 2020

I. FACILITY INFORMATION

A. General Information

1. General description of the facility

The owner Construction Waste Management owns and operates this Class VI commercial landfill, (a construction and demolition waste landfill), in accordance with Utah Administrative Code R315 through 320 as revised February 1, 2007. The facility will largely service population centers along the Wasatch Front from Ogden to Provo and from Park City to Tooele. As a Class VI landfill the facility will not accept waste from a conditionally exempt small quantity generator of: hazardous waste. The facility will accept all types of: construction and demolition waste materials that will be placed and compacted in the landfill as it is received. At closure, the top surface will have an elevation of: about 4,434 feet above Mean Sea Level (msl) or an average of: 210 feet above the existing grades.

Construction and demolition waste includes materials, such as, concrete, asphalt paving, asphalt roofing, lumber, gypsum board, soil, rock and fines as well as general composite construction and demolition waste materials that would be difficult to separate. Generally speaking, the construction and demolition waste stream represents about 12 percent of: the community's total municipal solid waste (msw).

The site is located at 7213 West California Avenue (1300 South), adjacent to the future extension of: 7200 West. The landfill is in the landfill zone which is in close proximity to several other landfills. These currently operating waste facilities include the City/County landfill and composting operations, Waste Management landfill and ET Technologies soil remediation facility. To the west there are a number of: closed landfills and the Kennecott tailings pond. Located to the east are the Lee Kay Waterfowl Management Area wetlands that were constructed as a mitigation measure for construction predecessor of the Salt Lake City and county landfill.

2. Legal description of the property parcels A & B.

Following is a surveyor's legal description of the property:

(A)"Beginning at a point North 89°52'16" West 55.00 feet from the East Quarter Comer of Section 16, Township 1 South, Range 2 West, Salt Lake Base and Meridian, and running thence North 89°52'16" West 1261.24 feet to the East 1/16 comer of said Section 16; thence North 00°00'54" West 2643.87 feet; thence North 89°54' 19" East 924.35 feet; thence South 87°13'56" East 160.20 feet; thence North 89°54' 19" East 150.00 feet; thence South 45°03'44" East 36.79 feet; thence South 00°01'47" East 1273.96 feet; thence South 00°02' 13" East 1340.80 feet to the point of the beginning.

Containing 3,334,023.91 square feet equaling 76.593 acres."

(B)The Southwest quarter of the Northeast quarter of Section 16, Township 1 South, Range 2 West, Salt Lake Base and Meridian.

Containing 40 acres.

3. Proof of ownership

The property contains three parcels that are listed (parcels 14-16-20001, 14-16 20012, 14-16-200-007) with the Salt Lake County Recorders Office. As indicated by the Recorder's most recent records, the property is owned by Construction Waste Management. The parcel ending in 007 is currently under contract from Kennecott. Total acreage of these three parcels is about 116.6 acres.

4. Demonstration that the facility is proposed as a Class VI commercial facility.

The construction and demolition waste (Class VI) landfill is owned by Construction Waste Management, LLC (CWM). The Class VI facility will be also operated and managed by Construction Waste Management, LLC (CWM).

5. Waste type and anticipated daily volumes

As a Class VI landfill, the only waste types that are acceptable are concrete, asphalt paving, asphalt roofing, lumber, gypsum board, soil, rock and fines, general composite construction and demolition waste materials that would be difficult to separate. Estimates of the volume of construction and demolition waste materials that will be received on a daily basis range from 1,000 tons to 4,000 tons per day. The landfill will operate six (6) days per week 7:00 a.m. to 7:00 p.m. or as necessary to meet waste hauler demands.

6. Anticipated schedule of construction

The construction and demolition landfill will be constructed over the next 50 plus/minus years depending on the economy, new construction replacing old facilities, such as schools, hospitals, and state and county road construction projects. Current planning is for the landfill to be constructed in seven (7) phases. This will permit individual closure of each phase to provide a more aesthetic appearance as the land filling process is accomplished.

7. Historical survey documentation

During February 2008, P-III Associates conducted an intensive cultural resources inventory of the proposed landfill site. The scope of work included both a file search and field investigations. There were no sites that could be considered significant on the parcel; therefore, the consultant recommended that no additional cultural resource investigations be conducted. The consultant's final report was submitted to the State Historic Preservation Officer and no comments were received. A complete copy of Cultural Resources Report 5305-01-20803 is included as Appendix B.

8. Names and addresses on all property owners within 1000 feet of the Class VI landfill are given in Table J

As noted above, the project is located in a relatively open space environment. Actually, there are no domestic dwellings with a half-mile of this site. The Salt Lake County Records Office lists nine property owners within the application permit 1,000-foot notification specification. Major property owners include the State of Utah and Kennecott Utah Copper. The 1,000-foot perimeter line is also indicated on Figure 1.

9. Notification of the permit application to neighboring property owners; Renewal Application Sept. 2020 N/A prior as below.

Documentation that a notice of intent to apply for a Class VI Landfill Permit was performed by sending the nine (9) property owners a letter indicating CVWRF's intent to construct a Class VI landfill by registered/returned mail receipt. Copies of the mailing are included in Appendix C.

10. Name of the local governing body with jurisdiction over the Class VI landfill site

The landfill site falls within the jurisdiction of Salt Lake City, Utah.

II. LOCATION STANDARDS

A. Location of 100-year floodplain

Location of the 100-year floodplain was taken from the Flood Insurance Rate Map (FILM Number 49035C0275 E; effective date September 21, 2001 published by the Federal Emergency Management Agency FEMA). This map indicates a 100-year flood can occur along the Lee Creek channel. Areas of the 100-year floodplain are shown in the vicinity of the northwest corner of the landfill site, but the FILM does not give actual base flood elevations. However, the culvert crossing the intersection at 1300 South 7200 West could represent a hydraulic flow restriction causing some flooding in this area. Based on the FILM a floodplain elevation of 4222.5-feet above msl is expected which is about 2-feet below the lowest final grade at the landfill site. The FILM 100-year floodplain is shown on Figure 2.

B. Wetlands and endangered species determinations

Wetland delineation was conducted on the proposed landfill and additional 40 acres to determine whether any portion of the property may be considered wetlands, as defined by Section 404 of the Clean Water Act (CWA). Both Reports are attached in Appendix D.

A decision has been made by the owner to fill the "suspect" wetlands to maximize the capacity of the landfill site. In doing so, the owner acknowledges that it will need to negotiate with the ACOE as to the extent and type of wetlands replacement, i.e. wetland banking, necessary to be in compliance with the CWA. This is a long and complicated process and in order to forward with this application for a permit to operate a Class VI landfill, the owner agrees to comply with any final determination by the ACOE as to the extent and nature of mitigations required.

C. Groundwater separation from bottom fill layer

Historical groundwater contour elevations at the proposed landfill site range from about 4219.50 at the north end to 4216.500 near the south end of the property². These elevations were further verified during installation of six (6) groundwater-monitoring wells required by the Salt Lake County Health Department (see Table 2 for depth to groundwater at the six (6) groundwater monitoring well locations). Due to the sloping nature of the ground surface, an average depth to groundwater from existing grade is about five (5) to seven (7) feet at the present time.

To permit initial excavation of the site to clear surface vegetation and poor soils, an exemption from the customary 10-foot (R302-2(e) (B)) separation between groundwater and the lowest elevation of the fill materials was requested from the Salt Lake Valley Health Department (SLVHD). The exemption was granted largely due to the poor quality of groundwater in the vicinity of the landfill site and the low moisture content of construction and demolition waste materials. However, the depth of excavation will be limited to the extent of the five-foot separation between the waste and groundwater is maintained.

D. Site hydrogeology

The landfill project site lies between two (2) drainage areas: Lee Creek and Kersey Creek. Both act as drainage conduits for storm water in the area of State Highway 201 and 5600 West (storm water from Salt Lake City and West Valley City). Of the two creeks, Lee Creek has the largest capacity for winter flows at about 100 cubic feet per second (cfs) whereas Kersey Creek winter flows typically do not exceed 40 cfs³. Due to the northeasterly slope of the site, about one half of the storm water runoff will ultimately drain into Lee Creek. The remainder will flow toward Kersey Creek which ties into the East C-7 Ditch before entering the Great Salt Lake.

Surface water quality is mostly poor due to the alkaline nature of the surface soils. Studies of surface water quality were obtained during the Kennecott Tailings Pond Expansion Environmental Impact statement (EIS)⁴ and over twenty years of Storret⁵ water quality data for Lee and Kersey creeks are summarized in Table 3.

E. Neighboring land uses

Neighboring land uses with 0.25-mile of the landfill site include open space, agricultural, and mining. Several active as well as closed landfills border the site. The proposed landfill site is also within Salt Lake City's Landfill Overlay District as indicated on Figure 3. The only active neighbor within the 0.75-mile criteria is Waste Management's construction and demolition wastelandfill.

F. Distance to nearest local turbojet as well as piston-type airport

The nearest regional airport capable of accommodating turbojet engines as well as piston-type aircraft is the Salt Lake International Airport. This airport is located to the northeast of the proposed landfill site at a line-of-sight distance of about 8.96-miles or 47,310-feet. Propeller type aircraft also fly in and out of the Salt Lake International Airport.

III. FACILITY TECHNICAL INFORMATION

A. Topographic features

The existing site is rectangular shaped, proposed is flag shaped parcel located in the upper half 1- quarter section of Section 16 Township 1, Range 2 East at about 1300 South 7300 West in Salt Lake City, Utah. The site is relatively flat with areas of seasonal ponds (winter only) and some potentially "suspect" wetlands areas. Overall slope across the site is from south to north at about 0.15 feet per 100 feet.

CVWRF currently operates the site as a Class VI landfill and chipping compost manufacturing facility. The site has a large concrete pad (450- feet x 450-feet) and a 100-feet x 60-feet metal building used for equipment storage. The remaining portions of the site are undeveloped and vegetated with native grasses, sagebrush and weeds. This site is also located within the Salt Lake City Landfill Overlay District. The additional adjacent parcel is located within Magna city and approved through conditional use permit for class VI landfill.

Topographic features as well as contour elevations are shown on Figures 4 and 5.

B. Hydro-geologic assessment

As discussed in the section on water quality, hydrology at this site was highly influenced by the sedimentary deposits of Lake Bonneville. These sediments have overlaid bedrock over millions of years. There are three (3) principal aquifers in the Great Salt Lake area: the Bedrock Aquifer, the confined Principal Aquifer and the unconfined/confined Shallow Aquifer. All aquifers are present at the proposed construction and demolition waste landfill site. The Bedrock Aquifer is overlain by more than 1,200 feet of sediment in the vicinity of the Kennecott tailings pond. The Shallow Aquifer also extends at least 100 feet below ground surface as reported in the Geotechnical Report.

The principal water supply wells and the source protection zones together with the recharge areas adjacent the Oquirrh Mountain Range is shown on Figure 6. The protected zones include: 1) 100-foot critical zone, 2) bacteriological zone (250-feet), 3) the monitoring required zone and 4) the

15-year pollutant travel zone. These protected zones are well outside the project's area of influence and as a result, the project will not have any impact on drinking water resources.

Overall groundwater flow in the Shallow Aquifer is to the northwest, towards the Great Salt Lake; however, some local groundwater to and discharges into topographic lows that occur in the vicinity of the site, which is reflected in the presence of evaporative flats, wetlands, ponds and drainage canals. The average horizontal hydraulic conductivity in the area of the Great Salt Lake is at least two to three times greater than the vertical hydraulic conductivity. Groundwater flow gradient in the vicinity of the landfill site is shown on Figure 7 included in the Groundwater Monitoring Plan.

Estimated hydraulic conductivities in the Bedrock Aquifer range from 1×10^{-4} to 1×10^{-1} centimeters per second (cmls)⁴. An average hydraulic conductivity of 6×10^{-6} cm/s⁴ has been reported for the Principal Aquifer in the Great Salt Lake area. The Shallow Aquifer vertical permeabilities range from about 2×10^{-8} cm/s to 4×10^{-5} cm/s⁴.

Groundwater quality is generally poor below the site. TDS typically ranges between 4,000 and 28,000 mg/l well about Utah standards for beneficial uses and wells (less than 1,000 mg/l⁵) that usually only draw water from just above the bedrock layer near Magna. A summary of groundwater quality characteristics is given in Table 4.

C. Plans, specifications and calculations

Design of the construction and demolition waste landfill consists of plans, specifications and engineering calculations necessary to support the design. The plan set includes general, civil and landscape drawings (full set of 33 full-size drawings plus two 3-D sheets to show the visual aspects of the project). Calculations are provided for hydrology, slope stability and total volume of each phase of construction are provided in Appendix E.

D. Unit design features

1. Liquefaction, seismic slope stability and erosion potential

The landfill design will be an elevated mound. Basic seismic design criteria were established in the geotechnical report by Y² Geotechnical, P.C. A generalized dynamic response analysis was performed using commonly accepted geotechnical ground acceleration values. These design

criteria were subsequently to calculate liquefaction and slope stability

- Liquefaction: According to the Salt Lake County liquefaction map, this site is in an area classified as having high potential for liquefaction. A preliminary analysis of liquefaction by Y² Geotechnical, P.C. indicates a potential for up to 4.5-inches of differential settlement at the surface at closure.
- Seismic slope stability: The Initially, site fill was analyzed for a slope of 2H:1V (horizontal to vertical) Extending to an elevation of 300-feet above ground surface. The 2H:1V slope was determined to have a stability safety factor of 1.44 (typically an FS of 1.3 is considered safe), which is actually conservative since the total fill high is only 200-feet.
- Erosion potential: Erosion potential of the proposed vegetative soil cover layer of the final cover at the end of the 30-year post-closure period was estimated using the Universal Soil Loss Equation (USLE)6. The USLE estimates soil loss in tons per acre. The results of these calculations are presented in Table 5 for both 3H:1V and 2H:1V slopes. The projected erosion, approximately of 0.6 inches of over 30-years, would be relatively small amount of the proposed 24-inches of final soil cover layer.

2. Fill methods

Construction and demolition waste materials will be placed and spread in layers not exceeding two-feet in compacted total thickness. Each layer of waste materials will be compacted into active the active face of the fill at the end of each operating day. A clean stockpile of soil material (about 5,000 yd³) will be maintained on-site to address fires, odors,

litter, and vector problems, if they occur.

The landfill will be constructed in phases (five phases total) starting from the southern end of the property and progressing northward. The initial phases will increase a final elevation of about 4,334-feet above msl at which time final cover layers will be placed over the final grade on slopes of the completed initial fill. Final cover will also be placed on each interim phase as they reach final grades. This

will facilitate closure in a progressive manner and minimize the unsightliness of uncompleted final cover areas.

3. Final cover design

Design of the final cover for the construction and demolition waste landfill is based on regulations of the permitting agencies. Both agencies with permitting authority in Salt Lake County, i.e., the State Department of Solid and Hazardous Waste (SDSHW) and the Salt Lake Valley Health Department (SLVHD) having differing requirements for construction and demolition landfills. For example, cover specification cited in the SDSHW regulations for a construction and demolition landfill requires that the landfill be closed by 1) leveling the waste to extend practicable, 2) covering the waste with a minimum of two-feet of soil, including six-inches of topsoil, 3) contouring the cover as specified in Subsection R3150303-3(4)(a)(i)(b), and 4) seeding the cover with grass or other shallow rooted vegetation or other native vegetation approved by the Executive Secretary.

On the other hand SLVHD (Regulation #1, subpart 4.1.5(ii) p,q,r and s) requires that 6-inches of compacted cover to be placed daily, or as often as required by the Director, after compaction of the waste material to smallest practical volume. Cells that will not have additional waste placed on them for 30 days will be covered with 12-inches of compacted cover material. At final closure, or within 12-months after receiving the last load of waste materials within a particular phase of construction, the operator will cover the completed section with at least 2-feet of compacted final cover material. The final cover layer of the landfill on any completed portion of the landfill will also be vegetated to minimize erosion and maximize evapotranspiration.

Following discussions with both agency staff members, the following cover design criteria were established;

- Since the waste is construction and demolition materials that are less susceptible to the problems posed by MSW, such as, vectors, odors, dust, etc., daily cover at the exposed face of the landfill will not be required,

- Total cross section of the final cover will consist of a layer of native material which has hydraulic conductivity of 1×10^{-5} cm/sec as determined by field tests. Compacting the native soils for the final cover layer to 90 - 95 percent relative density will ensure a final permeability of 1×10^{-8} . Total thickness of the final cover layer will be 24-inches.
- A soil amendment (composted biosolids) will be incorporated into the top 6-inches and seeded with native grasses (see specification on Drawing L1001) to minimize infiltration and erosion of the final cover layer.

A cross-section of the final cover design is on Figure 8. The cover layers will be placed into two separate operations. First, a layer of low hydraulic conductivity material of 18-inches will be placed covering the fill. To obtain this level of permeability of 10^{-8} cm/s, final cover material will be compacted to 90 percent to insure that surface water (precipitation) does not enter the fill material and become trapped in construction and demolition waste material above the foundation (bottom) layer. The initial final cover layer will be placed on completed sections/phases as the landfill phases are completed.

For protection from erosion, a second and final vegetative cover layers will be placed on top of the impermeable layer. This layer will consist of a mix of soil, for stability, and organic material (biosolids) to support vegetative growth. The final vegetative cover layer will be placed and seeded after final grading, compaction and testing of the low hydraulic conductivity layer is completed at closure of each phase of the project.

Sufficient quantities of both soil materials are available on site from the excavation of the original grade. Quantities of the final cover layers are given in Table 6.

E. Design and location of run-on/run-off control systems

Proposed elevations of new landfill site along the perimeter fencing will be above existing ground elevation. Consequently, run-on will not be an issue for this project. Conversely, run-off, especially due to the impervious nature of the final cover must be addressed. Initially, until phases 1, 2, and 3 have been completed, all run-off will be collected and conveyed to a storm water retention pond at the north end of the site. This will provide containment of any sediment and pollutants from discharging

from the perimeter of the site as well as collection and treatment of storm water draining from any active fill areas. During the initial phases of the project, Drainage channels and temporary piping will convey storm water run-off to the retention pond.

All drainage facilities will be designed to convey peak flows from a 25-year storm event with 30-minute duration at the landfill site. Since data was not available for 25-year design event storm event, 10 and 100-year storms ⁷ were adjusted to provide an equivalent value of 0.835 inches per 30-minute period.

Design calculations are included in Appendix E. Table 7 shows the sizing of hydraulic conduits required for drainage of the site.

Upon completion phases 1, 2, and 3 surface run-off from the top surface and side slopes will be conveyed to Lee Creek and Kersey Creek as shown on Drawings C1004, C1005, and C1006. Storm water retention ponds designed to control sediments are included in the final site plan (this design is consistent with Storm Water Pollution Plans for construction projects over five-acres as required by the Clean Water Act).

F. Anticipated facility life

Anticipated life of the proposed landfill facility is difficult to gauge. This is due to the variability of incoming waste volumes and the amount of recycling that can be accomplished on site. Current estimates of incoming materials from the service area are about 6 pounds per person per day⁸ of which 12 percent represents construction and demolition waste. Using figure as a guide and the population the Wasatch Front area, a daily

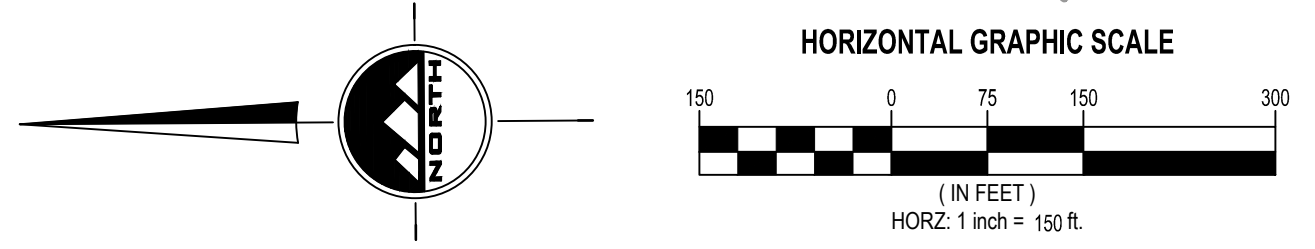
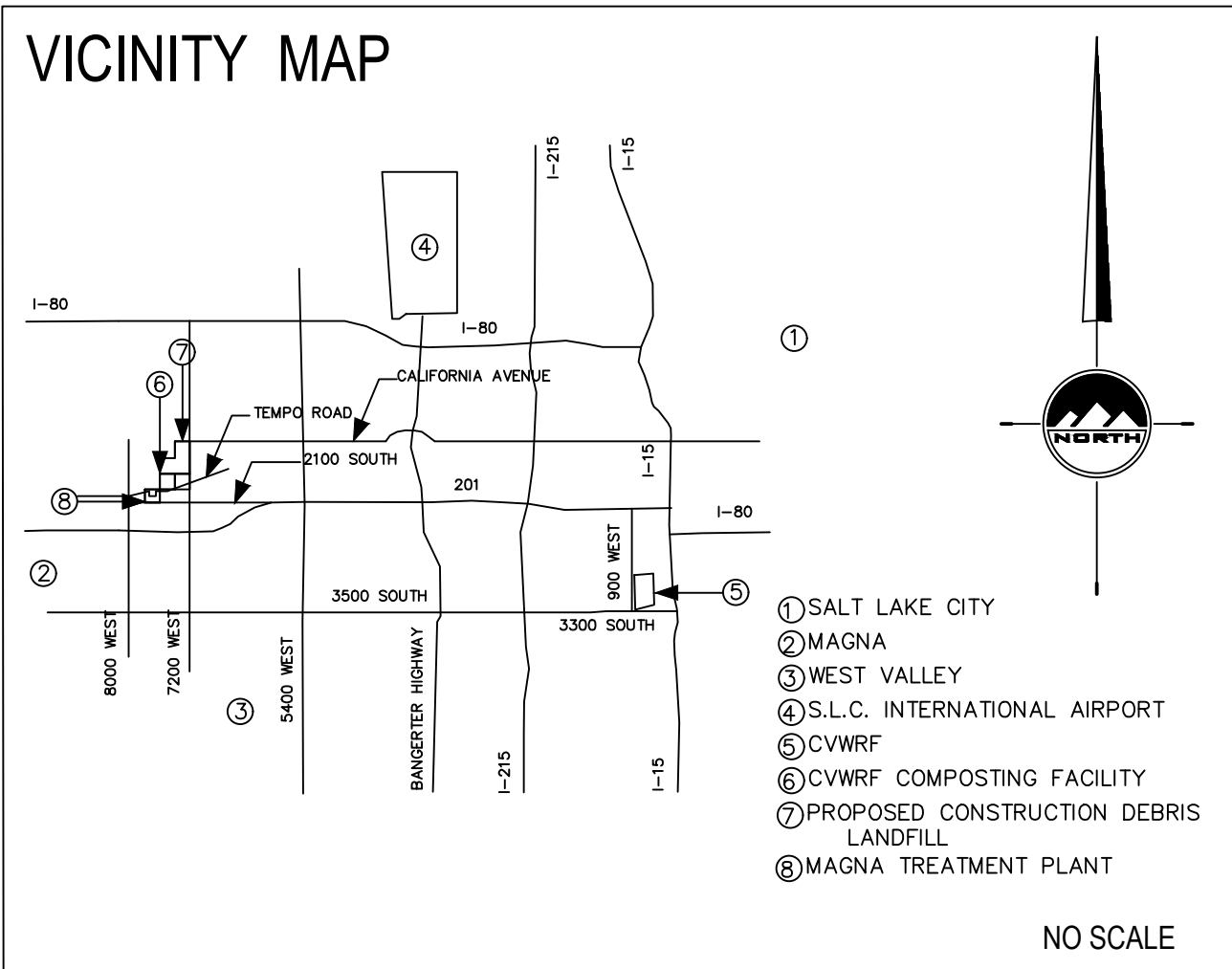
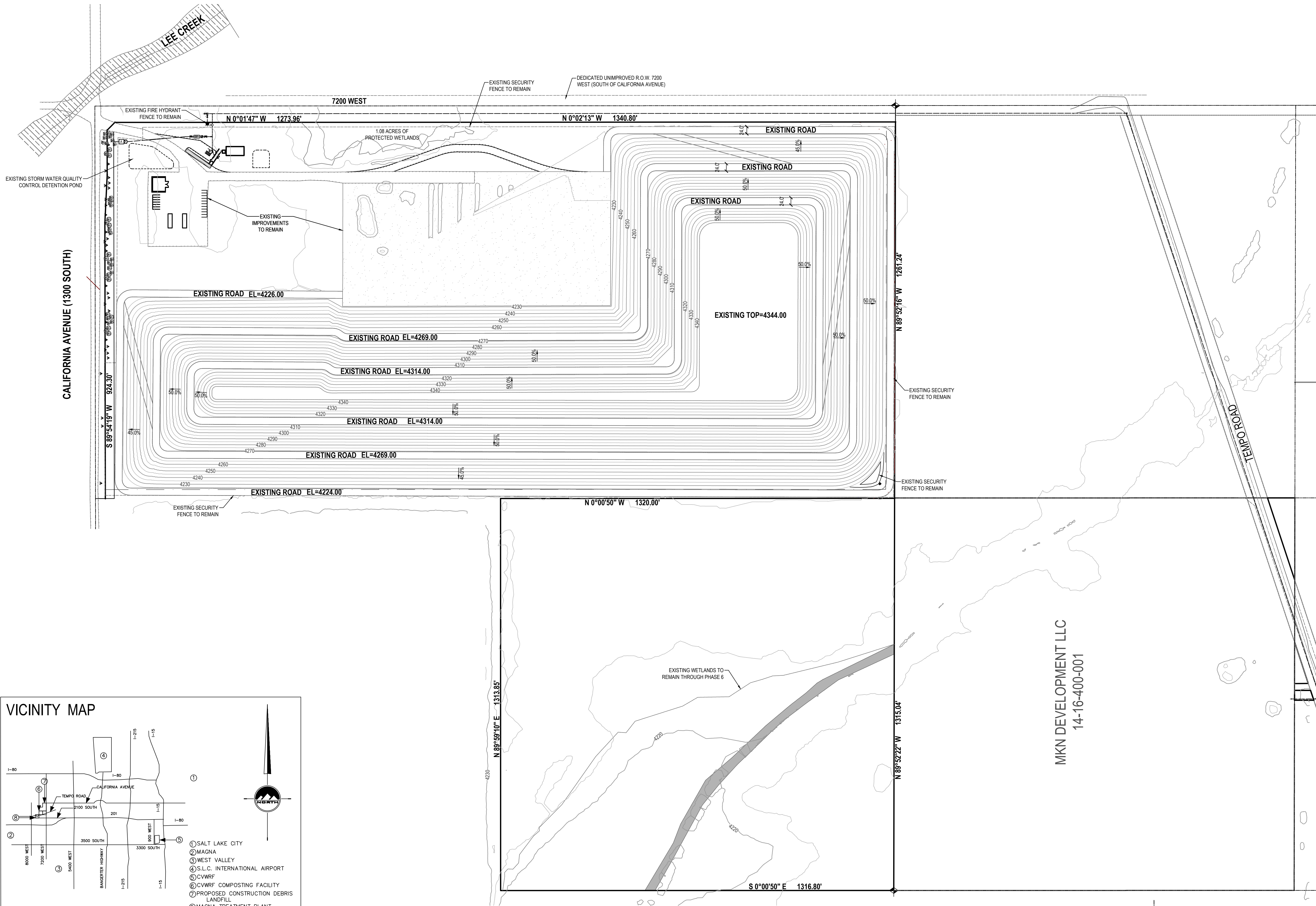
volume of construction and demolition waste that could be generated was estimated. Obviously, there are other choices for disposal of this material, such, as other landfills, recycling and deconstruction. The owner/operator indicates that this landfill may experience a daily input volume of between 1,000 and 4,000 tons of construction and demolition waste per day.

Converting this figure to volume represents between 667 yd³ and 2,667 yd³ an average of 1,667 yd³ per day.

Calculations of fill volumes and life for each of the seven phases are summarized in Table 8. These estimates and time lines are also subject to the construction and demolition activity along the Wasatch Front as well as the amount of recycling that can be accomplished.

G. Identification of borrow material (impermeable layer and soil) for final cover

Borrow material (impermeable layer and vegetative soil) for final cover is available on-site from the initial excavation of existing grade materials. Design of the final cover is discussed in the previous section. Clean fill materials will also be accepted at the landfill to provide an additional assurance that sufficient materials will be available for the final cover layers. The landfill site will be excavated from existing grade to a depth of about 2-3-feet. A separation (five feet) between the lowest layer of construction and demolition waste material and the highest groundwater level will be maintained during the initial excavation phases. Due to the phased nature of the landfill development, excavated cover material will be stockpiled on-site until it will be incorporated into the side slopes and top deck of each phase of construction filling.



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CONSTRUCTION WASTE MANAGEMENT

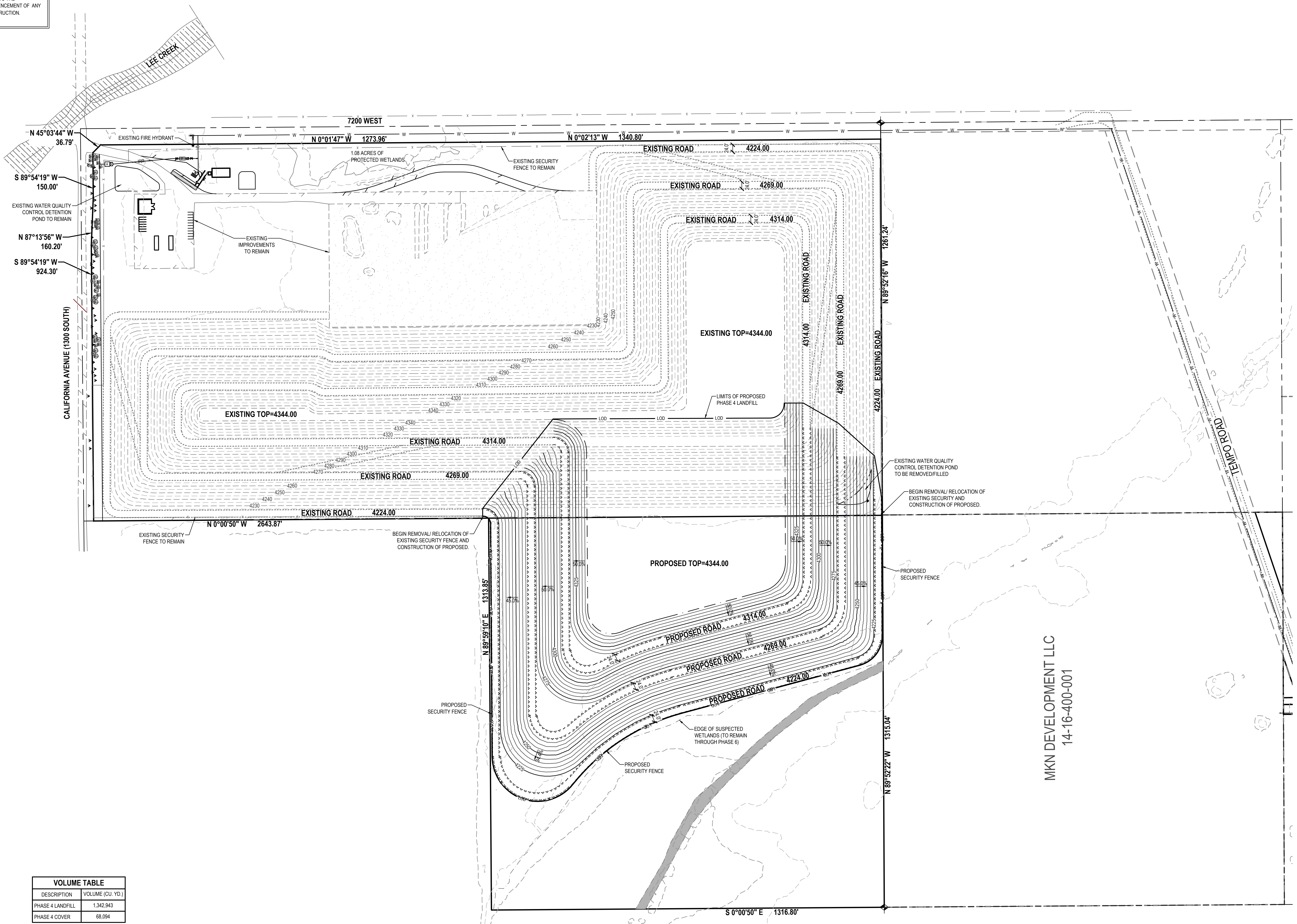
7213 WEST CALIFORNIA AVENUE
 SALT LAKE CITY, UTAH 84101



**EXISTING SITE PLAN
 PHASES (1 - 3A)**

PROJECT NUMBER: 4456B
 PRINT DATE: 3/4/21
 DRAWN BY: T. MAZEJY
 CHECKED BY: D. JENKINS
 PROJECT MANAGER: D. JENKINS

C-100



VOLUME TABLE	
DESCRIPTION	VOLUME (CU. YD.)
PHASE 4 LANDFILL	1,342,943
PHASE 4 COVER	68,094



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45 W. 10000 S., Suite 500
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CONSTRUCTION WASTE MANAGEMENT

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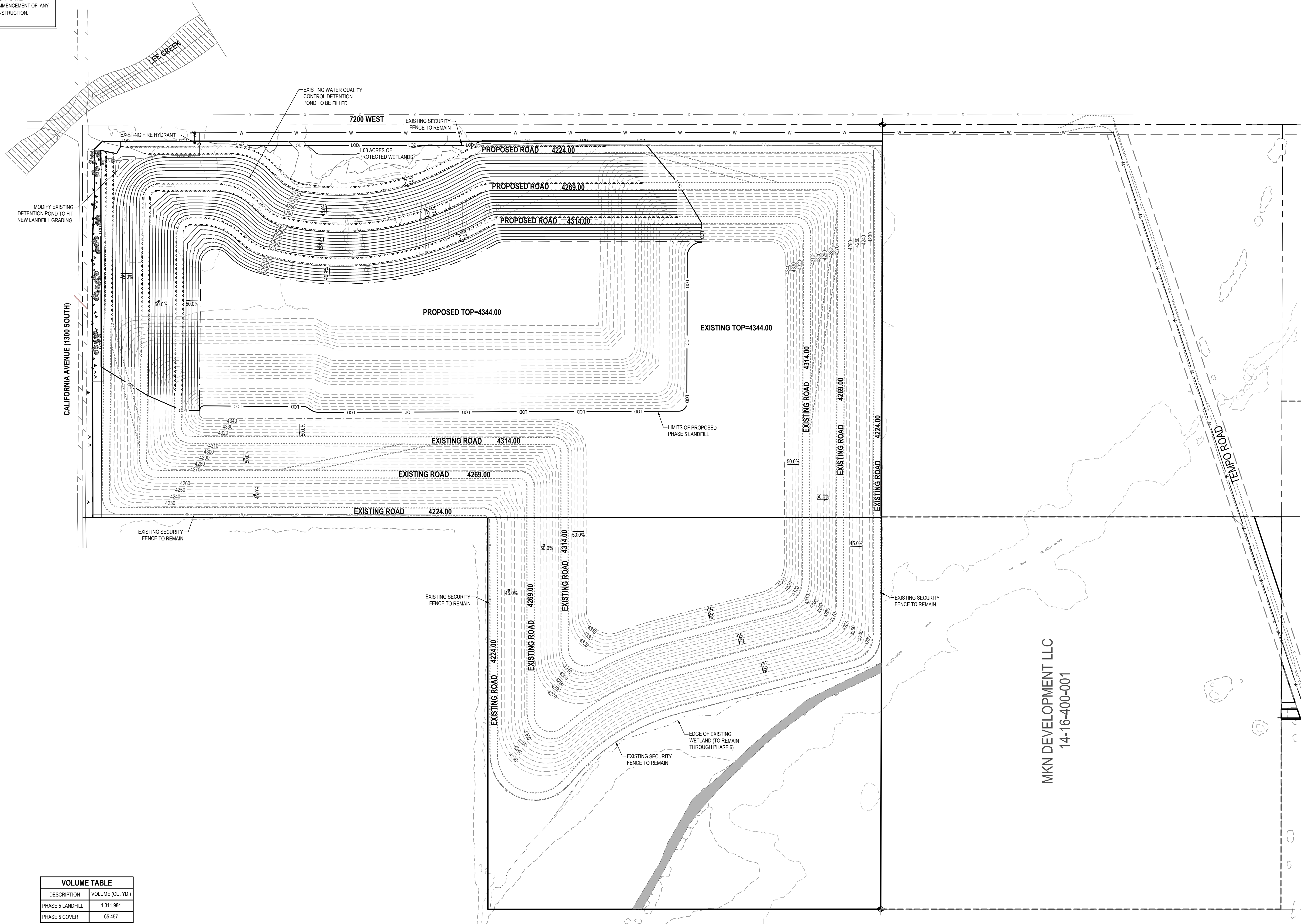


**SITE PLAN
PHASE 4**

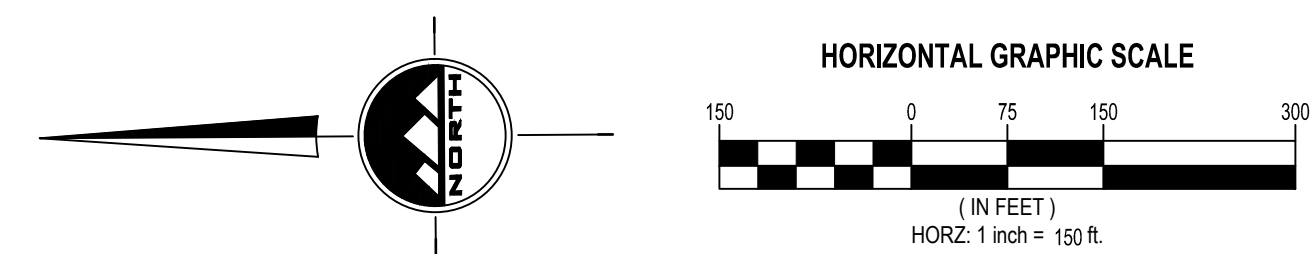
PROJECT NUMBER: 4458B
PRINT DATE: 3/4/21
DRAWN BY: T. MAZEJY
CHECKED BY: D. JENKINS
PROJECT MANAGER: D. JENKINS

C-101

811
 CALL BLUESTAKES
 @ 811 AT LEAST 48 HOURS
 PRIOR TO THE
 COMMENCEMENT OF ANY
 CONSTRUCTION.
 Know what's below.
 Call before you dig.



VOLUME TABLE	
DESCRIPTION	VOLUME (CU. YD.)
PHASE 5 LANDFILL	1,311,984
PHASE 5 COVER	65,457



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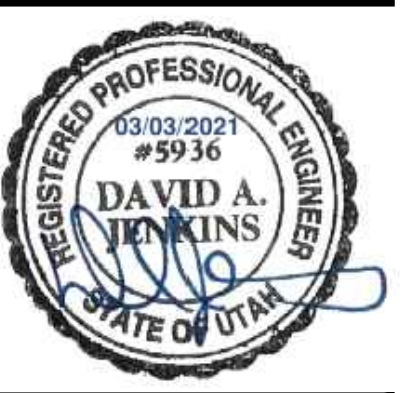
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 ROB REYNOLDS
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CONSTRUCTION WASTE MANAGEMENT

7213 WEST CALIFORNIA AVENUE
SALT LAKE CITY, UTAH 84101



SITE PLAN
PHASE 5

PROJECT NUMBER: 4456B
 PRINT DATE: 3/4/21
 DRAWN BY: T. MAZEJY
 CHECKED BY: D. JENKINS
 PROJECT MANAGER: D. JENKINS

C-102



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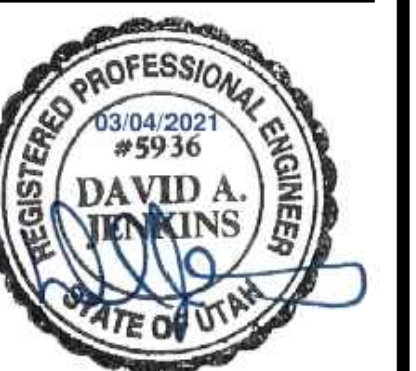
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CONSTRUCTION WASTE MANAGEMENT

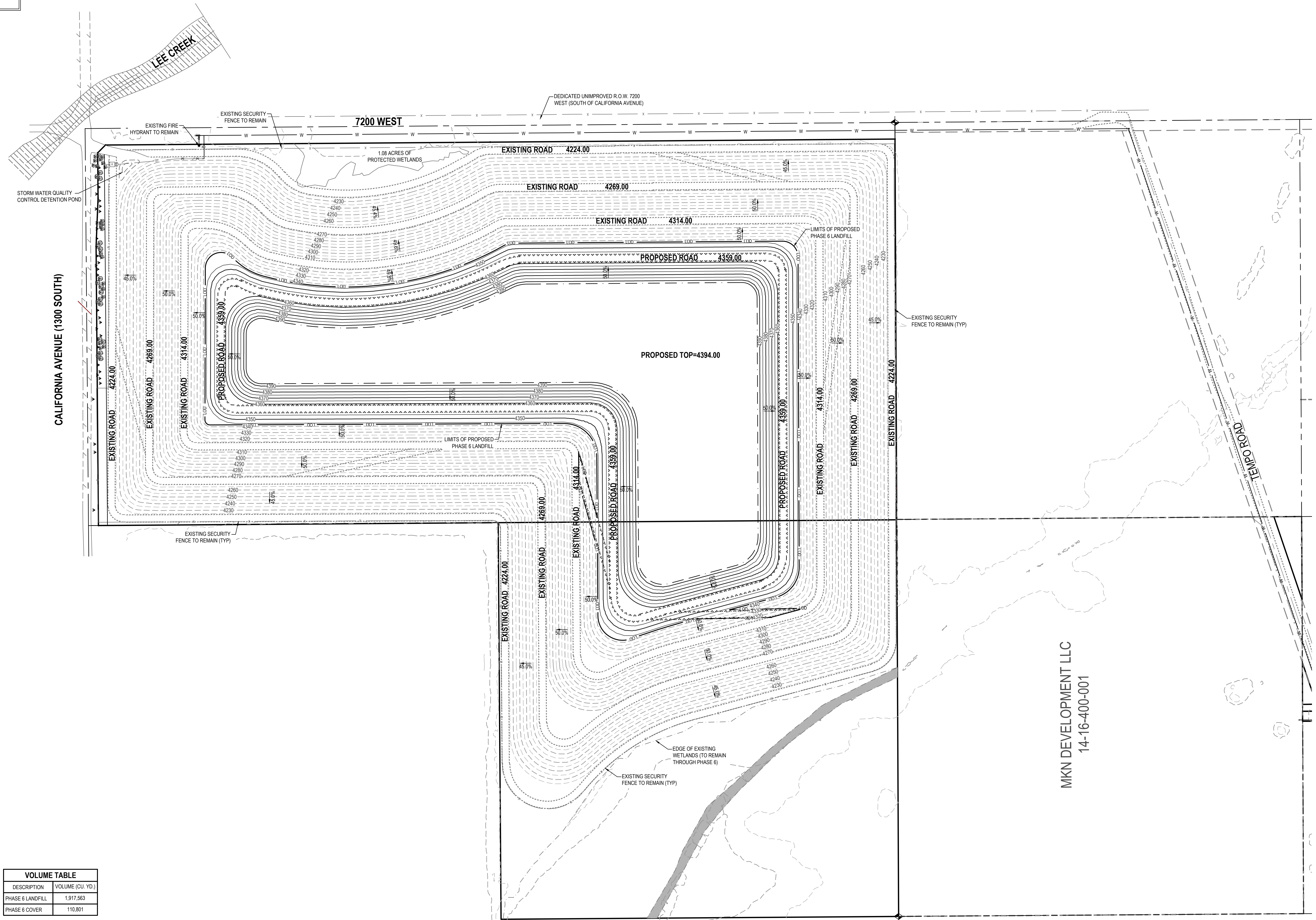
7213 WEST CALIFORNIA AVENUE
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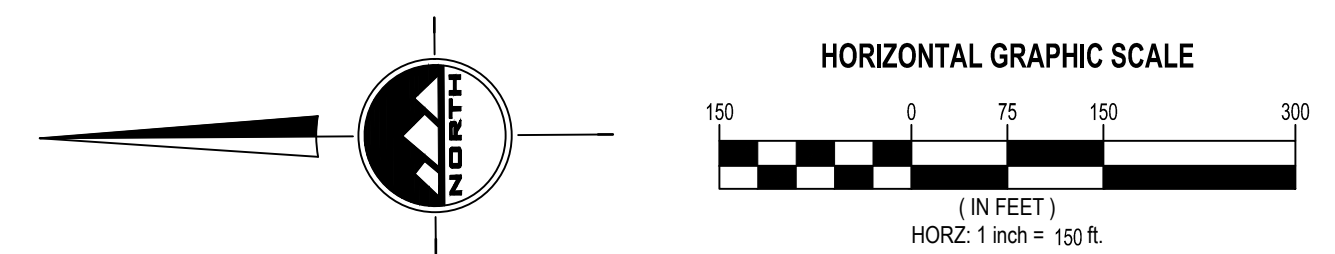
SITE PLAN
PHASE 6

PROJECT NUMBER: 4458B
PRINT DATE: 3/4/21
DRAWN BY: T. MAZEJY
CHECKED BY: D. JENKINS
PROJECT MANAGER: D. JENKINS

C-103



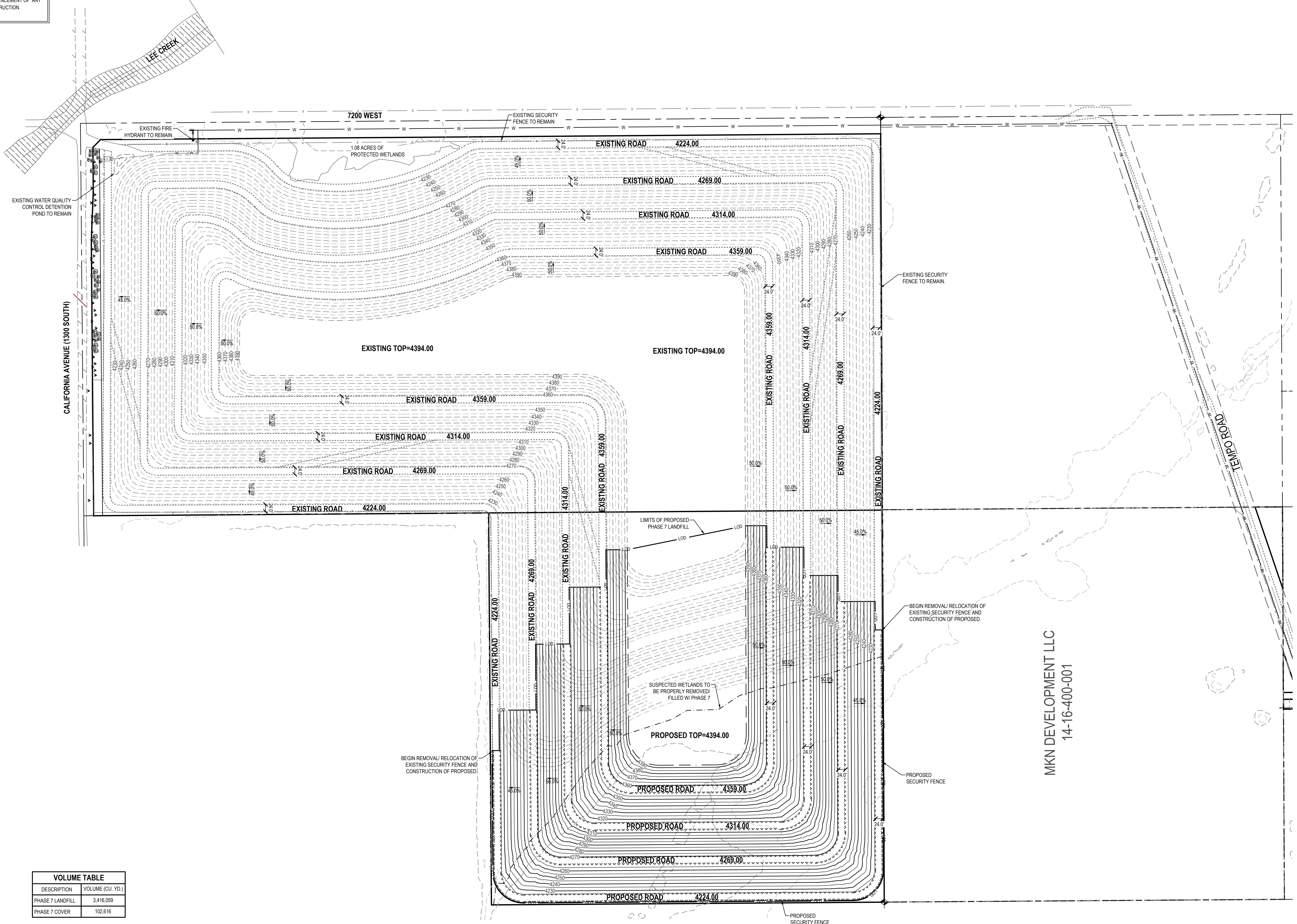
VOLUME TABLE	
DESCRIPTION	VOLUME (CU. YD.)
PHASE 6 LANDFILL	1,917,563
PHASE 6 COVER	110,801



MKN DEVELOPMENT LLC
14-16-400-001

811

CALL BLUESTAKES
@ 811 AT LEAST 48 HOURS
PRIOR TO THE
COMMENCEMENT OF ANY
CONSTRUCTION.
Know what's below.
Call before you dig.



VOLUME TABLE	
DESCRIPTION	VOLUME (CU. YD.)
PHASE 7 LANDFILL	3,416.059
PHASE 7 COVER	102.616

MKN DEVELOPMENT LLC
14-16-400-001



SALT LAKE CITY
45 W. 10000 S., Suite 500
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Phone: 801.255.0529

LAYTON
Phone: 801.547.1100

TOOELE
Phone: 435.843.3590

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FOR:
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8891 SOUTH 700 WEST
MIDVALE, UTAH 84047

CONTACT:
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CONSTRUCTION WASTE MANAGEMENT

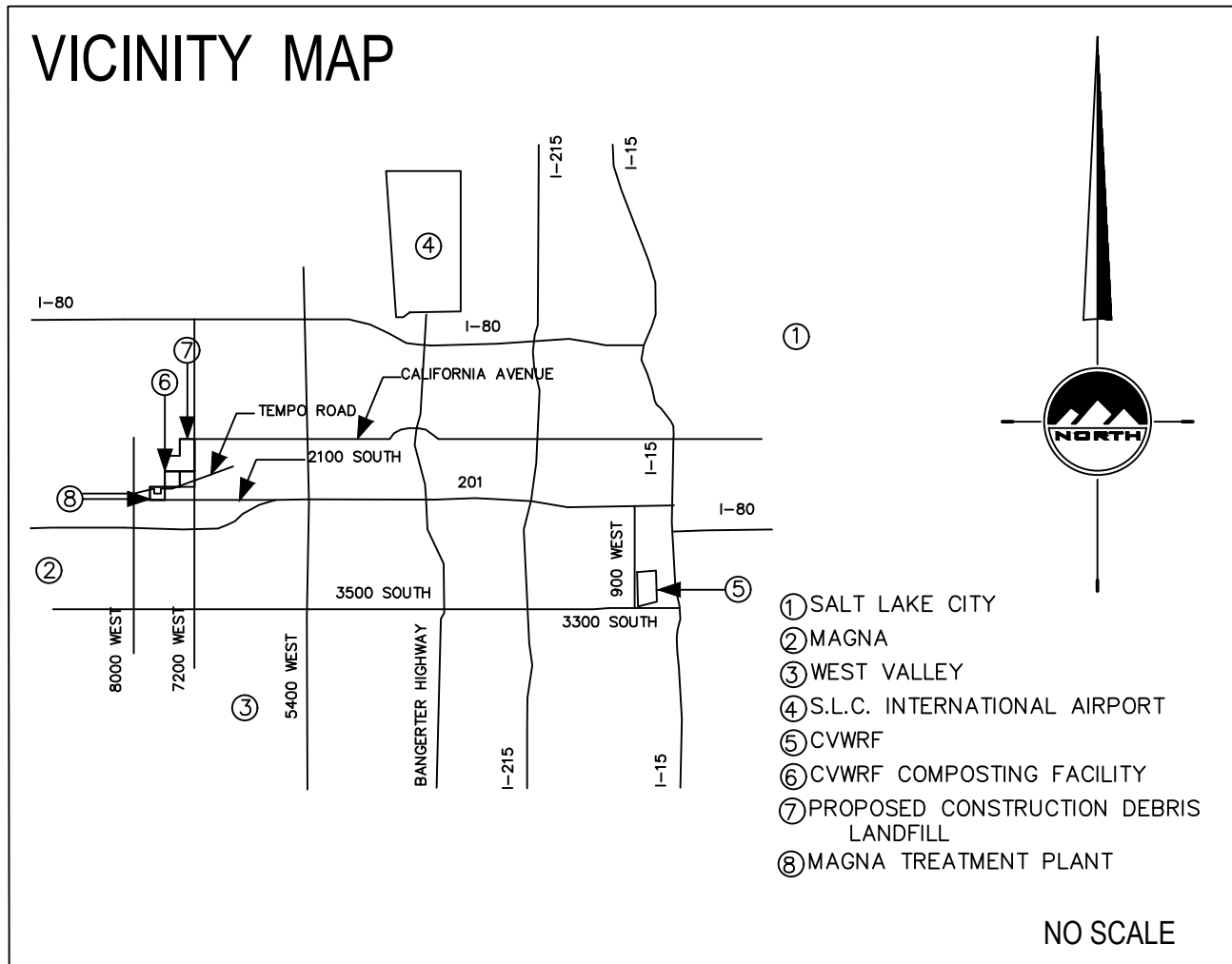
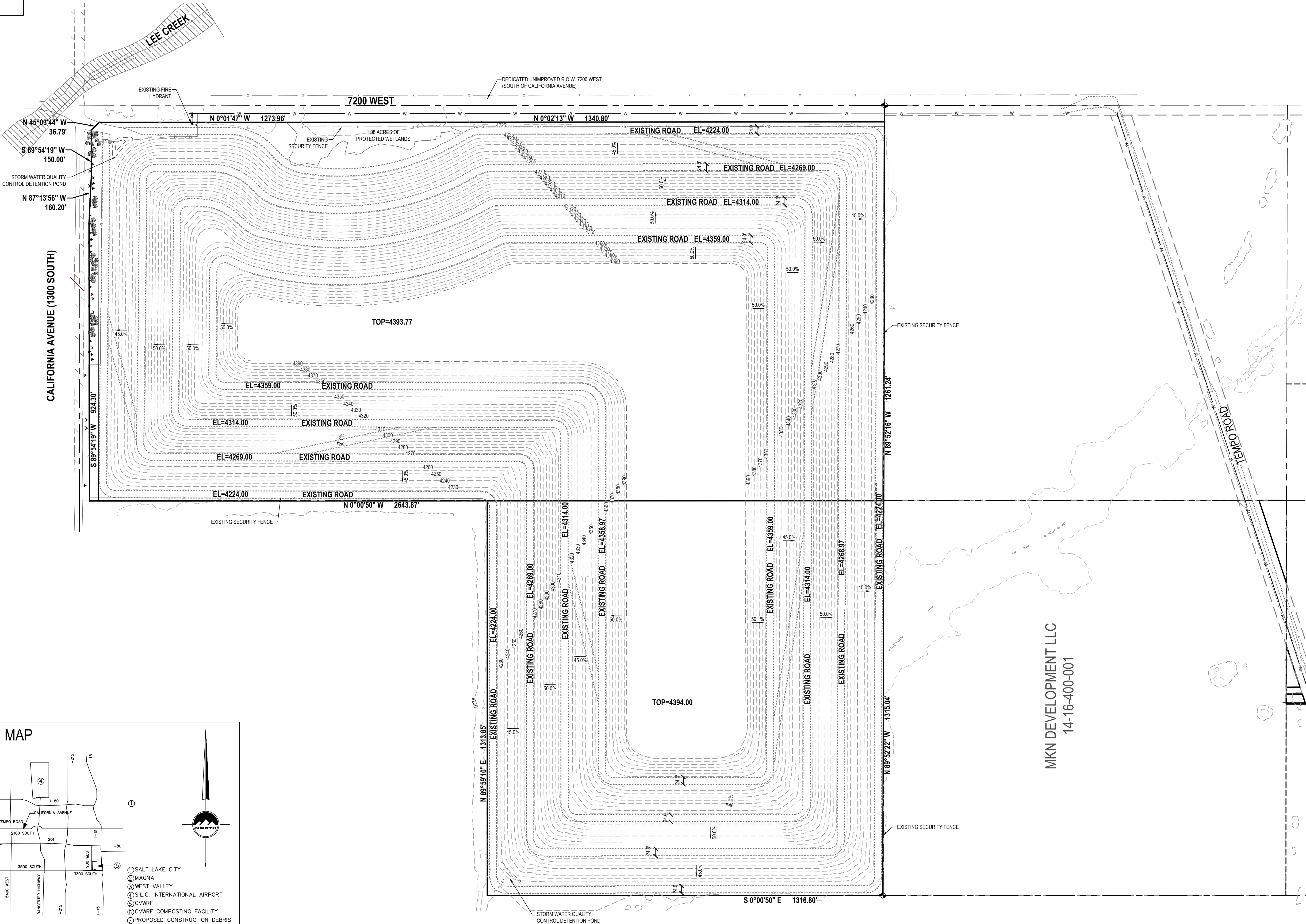
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SALT LAKE CITY, UTAH 84101



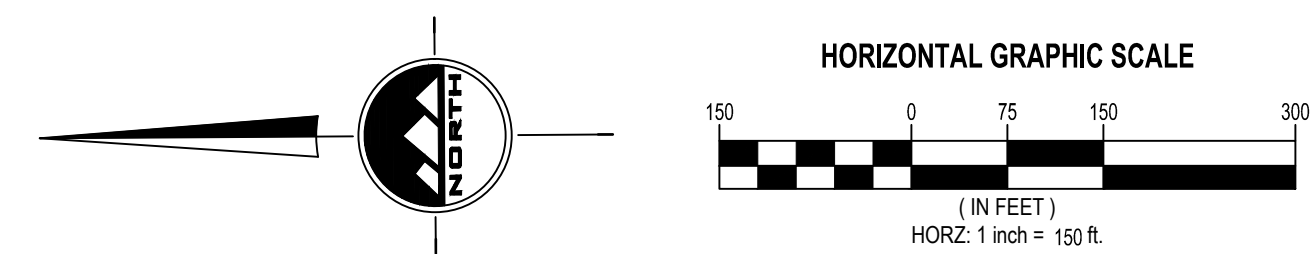
SITE PLAN
PHASE 7

PROJECT NUMBER 44568 PRINT DATE 3/4/21
DRAWN BY T. MAZEJY CHECKED BY D. JENKINS
PROJECT MANAGER D. JENKINS

C-104



MKN DEVELOPMENT LLC
14-16-400-001



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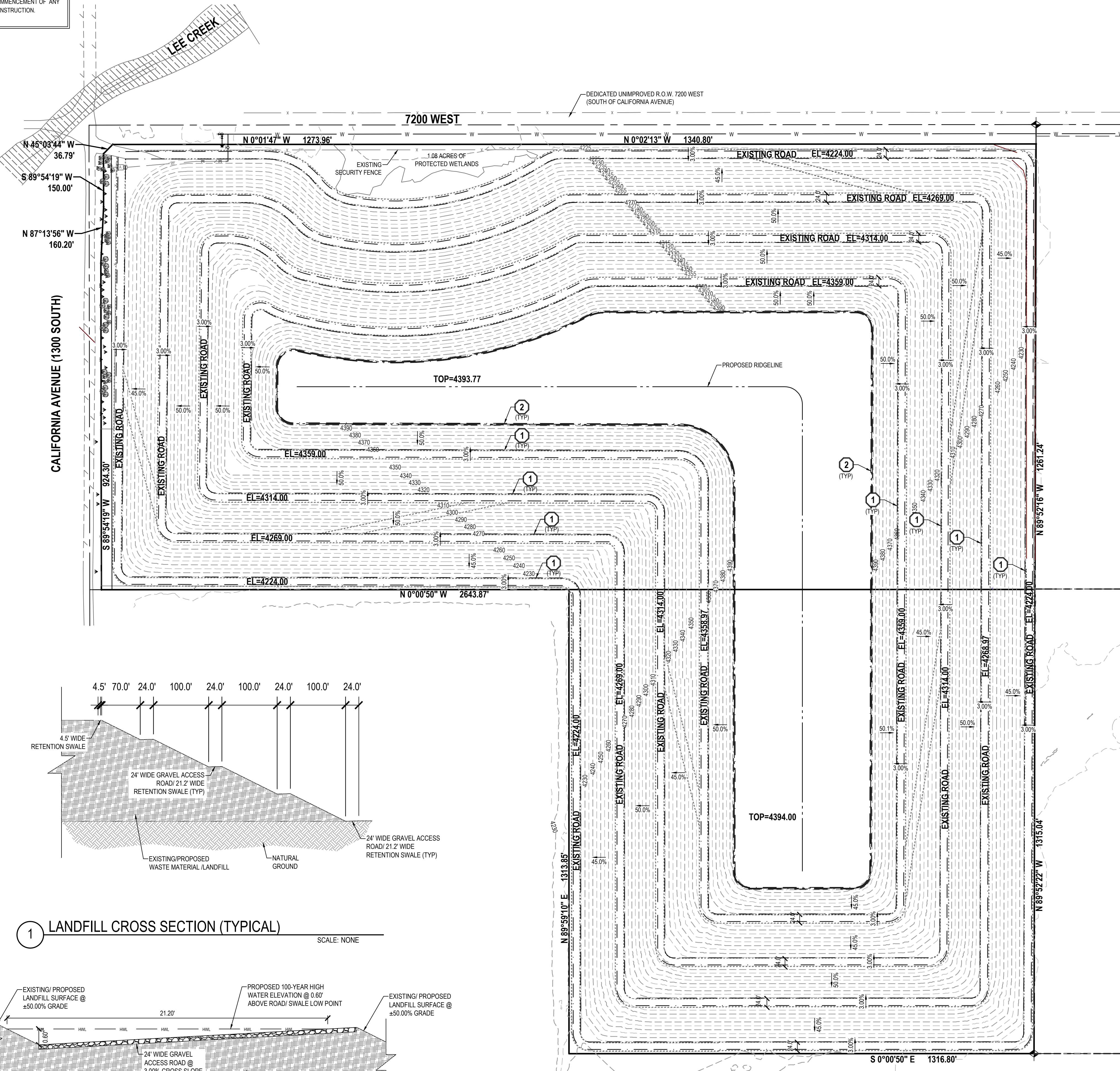
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**SITE PLAN
FINAL**

PROJECT NUMBER 4458B PRINT DATE 3/4/21
DRAWN BY T. MAZEJY CHECKED BY D. JENKINS
PROJECT MANAGER D. JENKINS

C-105



- GENERAL NOTES**
- ALL WORK TO COMPLY WITH THE GOVERNING AGENCY'S STANDARDS AND SPECIFICATIONS.
 - ALL IMPROVEMENTS MUST COMPLY WITH ADA STANDARDS AND RECOMMENDATIONS.
 - ALL WORK SHALL COMPLY WITH THE RECOMMENDATIONS OF THE GEOTECHNICAL ENGINEER POSSIBLY INCLUDING, BUT NOT LIMITED TO, REMOVAL OF UNCONSOLIDATED FILL, ORGANICS, AND DEBRIS, PLACEMENT OF SUBSURFACE DRAIN LINES AND GEOTEXTILE, AND OVEREXCAVATION OF UNSUITABLE BEARING MATERIALS AND PLACEMENT OF ACCEPTABLE FILL MATERIAL.
 - THE CONTRACTOR SHALL BECOME FAMILIAR WITH THE EXISTING SOIL CONDITIONS.
 - ELEVATIONS HAVE BEEN TRUNCATED FOR CLARITY. XX.XX REPRESENTS AN ELEVATION OF 48XX.XX ON THESE PLANS.
 - LANDSCAPED AREAS REQUIRE SUBGRADE TO BE MAINTAINED AT A SPECIFIC ELEVATION BELOW FINISHED GRADE AND REQUIRE SUBGRADE TO BE PROPERLY PREPARED AND SCARIFIED. SEE LANDSCAPE PLANS FOR ADDITIONAL INFORMATION.
 - SLOPE ALL LANDSCAPED AREAS AWAY FROM BUILDING FOUNDATIONS TOWARD CURB AND GUTTER OR STORM DRAIN INLETS.
 - EXISTING UNDERGROUND UTILITIES AND IMPROVEMENTS ARE SHOWN IN THEIR APPROXIMATE LOCATIONS BASED UPON RECORD INFORMATION AVAILABLE AT THE TIME OF PREPARATION OF THESE PLANS. LOCATIONS MAY NOT HAVE BEEN VERIFIED IN THE FIELD AND NO GUARANTEE IS MADE AS TO THE ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE EXISTENCE AND LOCATION OF THE UTILITIES SHOWN ON THESE PLANS OR INDICATED IN THE FIELD BY LOCATING SERVICES. ANY ADDITIONAL COSTS INCURRED AS A RESULT OF THE CONTRACTOR'S FAILURE TO VERIFY THE LOCATIONS OF EXISTING UTILITIES PRIOR TO THE BEGINNING OF CONSTRUCTION IN THEIR VICINITY SHALL BE BORNE BY THE CONTRACTOR AND ASSUMED INCLUDED IN THE CONTRACT. THE CONTRACTOR IS TO VERIFY ALL CONNECTION POINTS WITH THE EXISTING UTILITIES. THE CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE CAUSED TO THE EXISTING UTILITIES AND UTILITY STRUCTURES THAT ARE TO REMAIN. IF CONFLICTS WITH EXISTING UTILITIES OCCUR, THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO CONSTRUCTION TO DETERMINE IF ANY FIELD ADJUSTMENTS SHOULD BE MADE.
 - ALL STORM DRAIN INFRASTRUCTURE TO BE INSTALLED PER GOVERNING AGENCY OR APWA STANDARD PLANS AND SPECIFICATIONS.
 - ENSURE MINIMUM COVER OVER ALL STORM DRAIN PIPES PER MANUFACTURER'S RECOMMENDATIONS. NOTIFY ENGINEER IF MINIMUM COVER CANNOT BE ATTAINED.
 - ALL FACILITIES WITH DOWNSPOUTS/ROOF DRAINS SHALL BE CONNECTED TO THE STORM DRAIN SYSTEM. SEE PLUMBING PLANS FOR DOWNSPOUT/ROOF DRAIN LOCATIONS AND SIZES. ALL ROOF DRAINS TO HAVE MINIMUM 1% SLOPE.
 - THE CONTRACTOR SHALL ADJUST TO GRADE ALL EXISTING UTILITIES AS NEEDED PER LOCAL GOVERNING AGENCY'S STANDARDS AND SPECIFICATIONS.
 - NOTIFY ENGINEER OF ANY DISCREPANCIES IN DESIGN OR STAKING BEFORE PLACING CONCRETE, ASPHALT, OR STORM DRAIN STRUCTURES OR PIPES.
 - THE CONTRACTOR IS TO PROTECT AND PRESERVE ALL EXISTING IMPROVEMENTS, UTILITIES, AND SIGNS, ETC. UNLESS OTHERWISE NOTED ON THESE PLANS.

- SCOPE OF WORK:**
PROVIDE, INSTALL AND/OR CONSTRUCT THE FOLLOWING PER THE SPECIFICATIONS GIVEN OR REFERENCED, THE DETAILS NOTED, AND/OR AS SHOWN ON THE CONSTRUCTION DRAWINGS:
- PROPOSED DRAINAGE SWALE. SEE "SWALE PARAMETERS" SPREADSHEET AND SECTION 1 & 2/C-200 FOR DESIGN INFORMATION.
 - PROPOSED DRAINAGE SWALE FOR TOP OF LANDFILL. "SWALE PARAMETERS" SPREADSHEET AND SECTION 1/C-200 FOR DESIGN INFORMATION.

Waste Management		4456B
Salt Lake City, Utah		12/21/20
Rob Reynolds		1 OF 1
T. Mazejy	D. Jenkins	D. Jenkins

Soil Type D

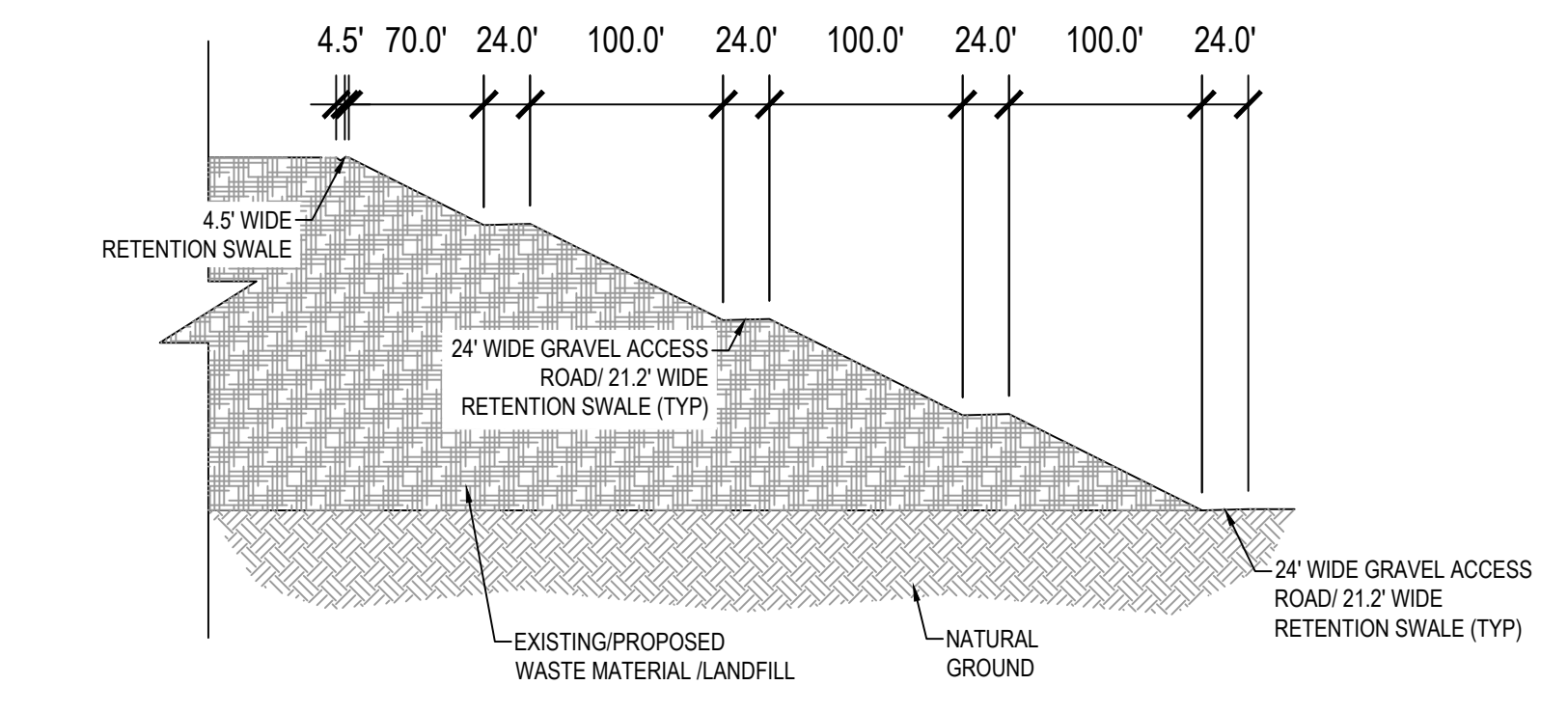
Post-Construction

Sub-basin Area (AC)	Area (Sq. Ft.)	Gravel (sq. ft.)	Landscape (sq. ft.)	Rational Coefficient	Swale Length	Lower Level	
1	28.17	1226990	263417	0.6	963573	0.25	10483.00
2	23.37	1017975	245148	0.6	772827	0.26	9106.00
3	22.69	988359	229870	0.6	758489	0.25	8189.00
4	15.00	653378	172018	0.6	481360	0.27	7092.00
5	15.54	676793	0	0.6	676793	0.15	6352.00
Total	104.76	4563495.00	910453.00	0.6	3653042.00	0.24	8717.50

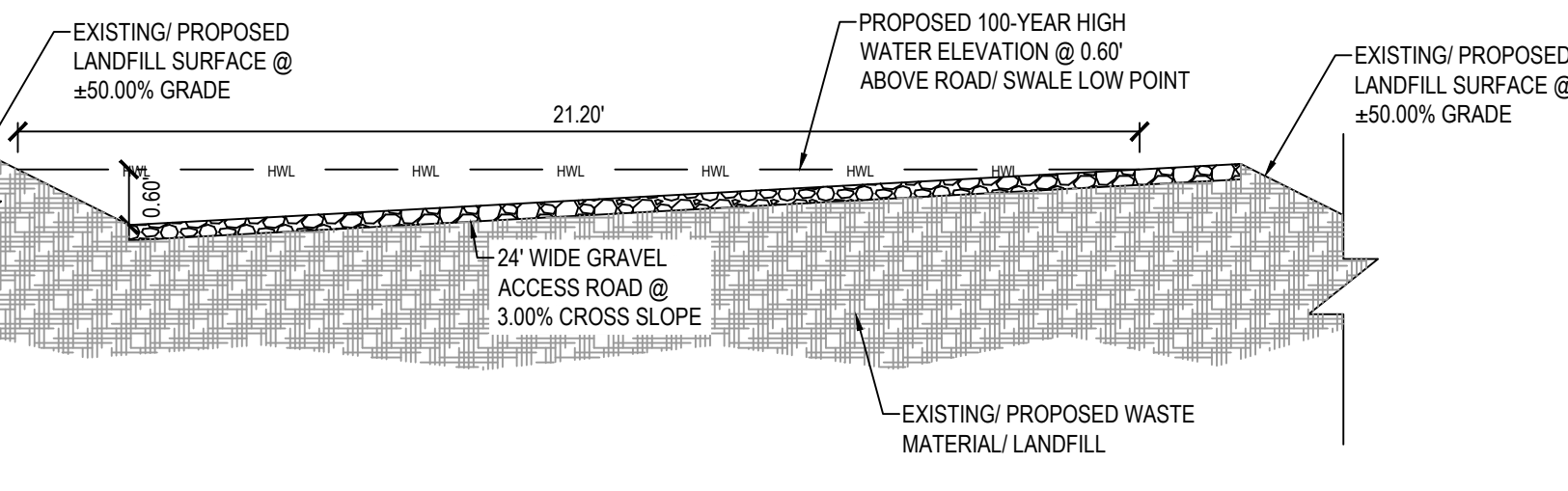
Swale Parameters

Sub-Basin Level	Landfill length (ft)	width (ft)	depth (ft)	area (sq. ft.)	volume provided (cu. ft.)	volume required (cu. ft.)
1 Lower Level	10483.00	21.2	0.6	6.36	66671.88	62,421
2 Level 2	9106.00	21.2	0.6	6.36	57914.16	54,264
3 Level 3	8189.00	21.2	0.6	6.36	52082.04	51,932
4 Level 4	7092.00	21.2	0.6	6.36	45105.12	36,190
5 Top	6352.00	4.5	1.5	3.375	21438	20,945

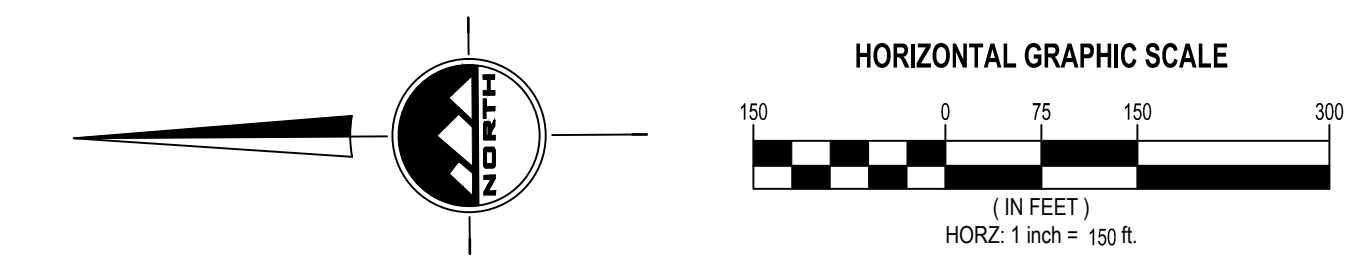
PROPOSED DRAINAGE NARRATIVE
THE RATIONAL METHOD WAS USED TO CALCULATE REQUIRED RETENTION VOLUMES FOR THE PROJECT SITE. THE SITE HAS BEEN ASSIGNED RUNOFF COEFFICIENTS ("C") OF 0.15 FOR WASTE MATERIAL AND 0.6 FOR GRAVEL AREAS, WHICH ARE REPRESENTATIVE OF THE HYDRAULIC SOIL GROUP "D", ASSIGNED TO THIS SITE BY THE UNITED STATES DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE. THE SITE IS DESIGNED TO SHEET FLOW ACROSS AREAS OF COMPACTED WASTE MATERIAL TO SWALES LOCATED AT EACH "LEVEL" OF THE LANDFILL. LEVELS ARE DELINEATED BY GRAVEL ACCESS ROADS SPACED AT APPROXIMATELY 45 VERTICAL FEET. AT COMPLETION, THE SITE WILL INCLUDE FOUR GRAVEL ROADS ENCOMPASSING THE PERIMETER OF EACH LEVEL OF THE LANDFILL. A SWALE WILL BE CREATED AT EACH LEVEL BY GRADING THE ACCESS ROADS TO HAVE A CROSS SLOPE OF APPROXIMATELY 3% TOWARDS THE INTERIOR OF THE SITE. THE TOTAL DEPTH OF EACH OF THESE SWALES WILL BE APPROXIMATELY 0.6 FEET, WITH APPROXIMATELY 0.12 FEET OF FREEBOARD ABOVE THE 100-YEAR HIGH WATER ELEVATION. ONE ADDITIONAL SWALE HAS BEEN PROPOSED AROUND THE PERIMETER OF THE TOP LEVEL OF THE LANDFILL. THIS SWALE HAS BEEN DESIGNED TO BE APPROXIMATELY 4.5 FEET WIDE BY 1.5 FEET DEEP. THE TOP OF THE LANDFILL WILL BE GRADED WITH A RIDGE AT THE MIDPOINT TO ENSURE THAT RUNOFF IS DIRECTED TO THE SWALE AT A MINIMUM SLOPE OF 2%. SWALES WILL BE GRADED IN AT EACH PHASE TO ENSURE THAT STORM WATER RUNOFF IS CAPTURED AND RETAINED THROUGHOUT THE LIFE OF THE PROJECT. EACH OF THESE 5 SWALES HAS BEEN DESIGNED TO ADEQUATELY RETAIN RUNOFF FROM THE 100-YEAR DESIGN STORM FOR THE PROJECT SITE (RAINFALL DATA OBTAINED FROM NOAA ATLAS 14). SEE STORM DRAIN INFORMATION AND SWALE PARAMETERS (SHEET C-200) FOR ADDITIONAL DESIGN INFORMATION.



1 LANDFILL CROSS SECTION (TYPICAL) SCALE: NONE



2 RETENTION SWALE CROSS SECTION (TYPICAL) SCALE: NONE



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CONSTRUCTION WASTE MANAGEMENT

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DRAINAGE PLAN FINAL

PROJECT NUMBER: 4456B
PRINT DATE: 3/4/21
DRAWN BY: T. MAZEJY
CHECKED BY: D. JENKINS
PROJECT MANAGER: D. JENKINS

C-200